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MEMORANDUM

DATE:

TO: John Osborn, FIT-RPO, USEPA, Region X

THRU: David Buecker, FIT-OM, E&E, Seattle

FROM: Karl A. Morgenstern, FIT-SM, E&E, Seattle

SUBJ: Draft Field Operations Work Plan
Spokane Junkyard Associated
Spokane, Washington

REF: TDD F10-8712-03

CC: ~~William Glasser~~ *Delorah Flood*, HWD-SM, USEPA, Region X
Joseph B. Hunt, FIT-PM, E&E, Seattle (memo only)
Thomas Tobin, E&E, Seattle (memo only)

Transmitted herewith are two (2) copies of the Spokane Junkyard Associated Work Plan. Coordinated review comments should be submitted by no later than _____ for incorporation into the final document. If you have any questions, please feel free to contact me directly.

KAM:rls

Enclosures

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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION	
1.1 Objectives and Scope	
1.2 Site Location and Description	
1.2.1 Soils	
1.2.2 Geology and Hydrology	
1.2.3 Climate	
1.3 Process Description	
2.0 BKG DATA COLLECTION ACTIVITIES	
2.1 Previous Investigative Activity	
2.1.1 Geophysics	
2.1.2 TAT Sampling	
2.1.2.1 Data Inerpretation	
2.2 HRS II Site Inspection Activities	
3.0 ON-SITE ACTIVITIES	
4.0 SAMPLING PROGRAM	
4.1 Sampling Rational	
4.1.1 Ground Water Pathway	
4.1.2 Surface Water Pathway	
4.1.3 Air Migration Pathway	
4.1.4 On-Site Exposure Pathway	
4.2 Sample Types, Numbers, and Analytical Requirements . . .	
4.3 Sampling Methodologies	
4.3.1 Soil Composite Sampling	
4.3.1.1 Residential	
4.3.1.2 Grid	
4.3.2 Soil Borehole Sampling	
4.3.3 Domestic and Public Well Sampling	
4.3.4 Personnel Safety and Equipment Decontamination . .	
4.4 Data Use	
4.5 Laboratory Notification	
4.6 Sample Documentation and Handling	
4.5 Investigation-Derived Wastes	

TABLE OF CONTENTS (Cont.)

<u>Page</u>		<u>Page</u>
5.0	SPECIAL FIELD INVESTIGATION PROCEDURES	
6.0	QUALITY ASSURANCE PROCEDURES	
6.1	Quality Assurance Objectives	
6.2	Quality Assurance Checks	
6.2.1	Calibration Procedures and Frequency	
6.2.2	Internal Quality Control Checks and Frequency	
6.3	Data Reduction, Validation, and Reporting	
6.4	Performance and System Audits	
7.0	PROJECT MANAGEMENT	
7.1	Schedule of Tasks and Milestones	
7.2	Budget and Costs	
7.3	Key Personnel	
7.4	Special Requirements	
7.5	Deliverables	

REFERENCES

APPENDIX A - EPA Target Compound List (TCL)

APPENDIX B - Sample Alteration Checklist

APPENDIX C - Sulfide/Oxidizing Agents Screening Method
[Optional - Use only if aqueous cyanide samples
are collected.]

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Milestone Chart	
2	Sample Summary	
3	Sample Handling Summary	
4	Instrument Calibration and Field Check Schedules	

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1	Sample Location Map (Topographic)	
2	Site Map, Spokane Junkyard Associated, Spokane, Washington	
3	Ground Water Flow	
4	TAT Sample Locations PCB	
5	TAT Sample Locations Metals	
6	Ground Water Well Locations Map	
7	Residential Soil Samples Locations	
8	On-Site Soil Samples Locations	

1.0 INTRODUCTION

Pursuant to U.S. Environmental Protection Agency (EPA) Contract Number 68-01-7347 and Technical Directive Document (TDD) Number F10-8712-03, Ecology and Environment, Inc. (E&E) is conducting an investigation of the Spokane Junkyard Associated (SJA) and associated sites in Spokane, Washington (Figure 1). The associated sites include an inactive metal scrapping/recycling facility (Spokane Metals) and three contaminated parcels of land under different property owners. The primary environmental and public health concern presented by the site is contamination of on-site and adjoining property soils by polychlorinated biphenyls (PCB) and heavy metals.

The SJA sites accumulated large amounts of asbestos and surplus chemicals for a number of years until operations were halted in 1986. The facility also accepted woodwaste, timber, scrap iron, derelict vehicles, and general household materials. ~~Spokane metals was involved in transformer and battery salvage from 19 to 19.~~ *denied by company insert years.*

This investigation is intended to 1) further evaluate the extent of soil and ground water contamination by PCB and/or heavy metals resulting from past operations at the site, and 2) to support the HRS II Field Test Study.

The SJA investigation will include lateral and vertical on and off site characterization of soils contaminated with PCB and heavy metals utilizing EPA sampling techniques. An evaluation of current hydrogeologic and hydrochemical conditions using existing off-site domestic and public water supply wells will also be conducted. The scope of activities under this investigation have been determined from the matrix of pathway specific data collection factors contained in the draft HRS II Model and in part, from past sampling efforts conducted by and analytical data obtained from the E&E Technical Assistance Team (TAT) investigations performed from July through September 1987.

1.1 Objectives and Scope

The objectives of the site investigation are to:

- o test the revised draft HRS II data collection strategies and techniques;
- o determine costs and LOE for various SI data collection tasks; and
- o score the site using the revised draft HRS II Model by following the draft proposed guidelines.

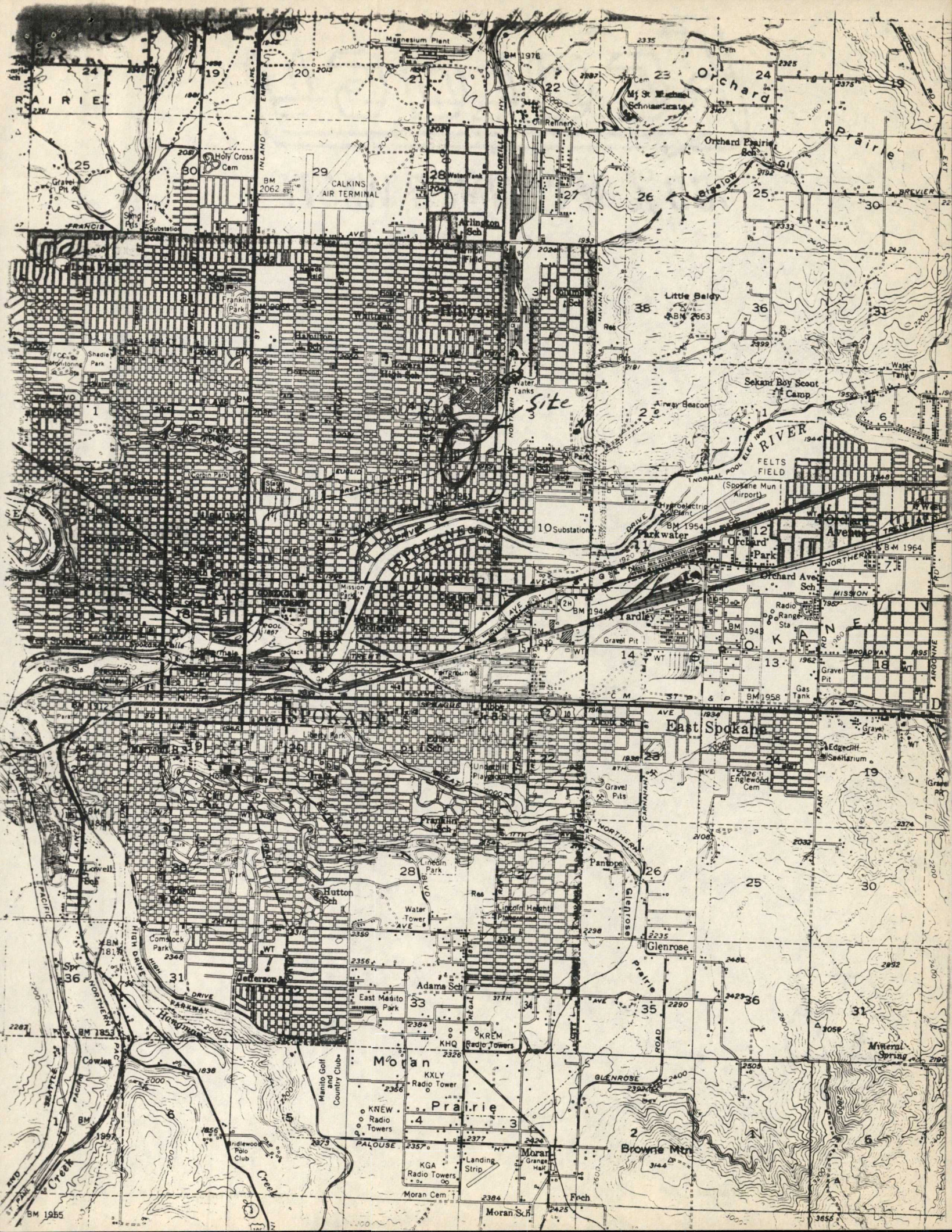
To accomplish these objectives, the following general field activities will be conducted:

- o collect six on-site surface soil composite samples at random and non-random locations in the northwest portion of the site;

Should it be called Spokane Junkyard + associated sites?

ask Jeff - will this sampling plan need to be provided to PR's community? If so, what do we do about reference to Field Test?

Can we want one of the real reasons - to further evaluate soil & glw contamination & determine public health impacts



is largely covered with scrubby and sparse vegetation and assorted debris and scrap metal (2). The site is bounded to the west by an elementary school and various residences and on the north by a pharmaceutical manufacturing plant. The northwest section is occupied by an auto towing outfit and an unused field owned by a (b)(6) *to the north of the site.* (Figure 2). The southern and western boundary of the site is bordered by a spur of the Burlington Northern Railroad, beyond which lies a seven acre grass field (Figure 2).

of the site
Elevations in the vicinity *of the site* ranges 1,880 feet above mean sea level (AMSL) in the Spokane River Valley 1/2 mile south of the site, to 2,620 feet AMSL in the foothills 1/2 mile to the east (Figure 1). Elevations at the site is approximately 2,000 feet AMSL. The general slope on site is 0-1% with a small gentle hill at ~~8-10%~~ *5-8%* slope occurring north of the auto towing outfit.

1.2.1 Soils

The soils underlying the Spokane Junkyard site are developed in glacial outwash materials and consists of very deep somewhat excessively drained gravelly loams. These soils typically contain 12-20% clay from 0-16 inches in depth and decrease in clay content to 0-5% at 60-70 inches below ground. The percentage of organic matter typically found in these soils is 2-5% (3). Below two feet in depth the soil is classified as a brown very gravelly loamy coarse sand with a high permeability rate of >20 inches/hour. The permeability ranges from 0.6 to 2.0 inches/hour (moderate) from 0-24 inches in depth. The Spokane County Soil survey classifies this soil as poor for septic tank absorption fields due to the excessive permeability rate which may cause pollution of the ground water. The pH for these soils ranges from 6.1 to 7.8.

*C*According to logs from test pits dug on-site, fill material overlies the native soil for most of the site. The thickness of the fill layer is approximately 1.5-2.5 feet beneath the junkyard and up to 4.5 feet under the Spokane Metals property (2). The fill material typically consists of gravelly sand with a little silt and occasional pieces of scrap metal (2).

1.2.2 Geology and Hydrology

During Pleistocene time, a major channel (the Spokane Valley; Figure 3) was cut into the granite bedrock by the catastrophic outburst of a large glacier-dammed lake to the east. The channel was subsequently filled with coarse glaciofluvial deposits consisting of poorly sorted sand, gravel, and in places, boulders (4). The site lies within the Spokane Valley along the eastern edge after the Valley curves to the north (Figure 3). Although the sediments are as much as 700 feet thick in the deeper parts of the Spokane Valley, the deposits underlying the site are approximately 200-250 feet thick.

The coarse-grained glaciofluvial sediments are the most permeable and productive rock unit in the study area. Yields of several hundred to several thousand gallons per minute are common in the Spokane aquifer

(b)(6)

Property

Hollister-Stier
Pharmaceutical
Manufacturer

Auto Towing
Outfit

Spokane
Metals

~~School~~
~~Bus~~
~~Depot~~
Lumber
Yard

Spokane
Junkyard

Burlington Northern
R.R. (Inactive)
Minus
Grid Lines

N
↑

Figure 2
Site Map
Spokane Junkyard
Spokane, WA.

Liberty St.

(.) = Areas of debris
and scrap metal

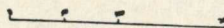
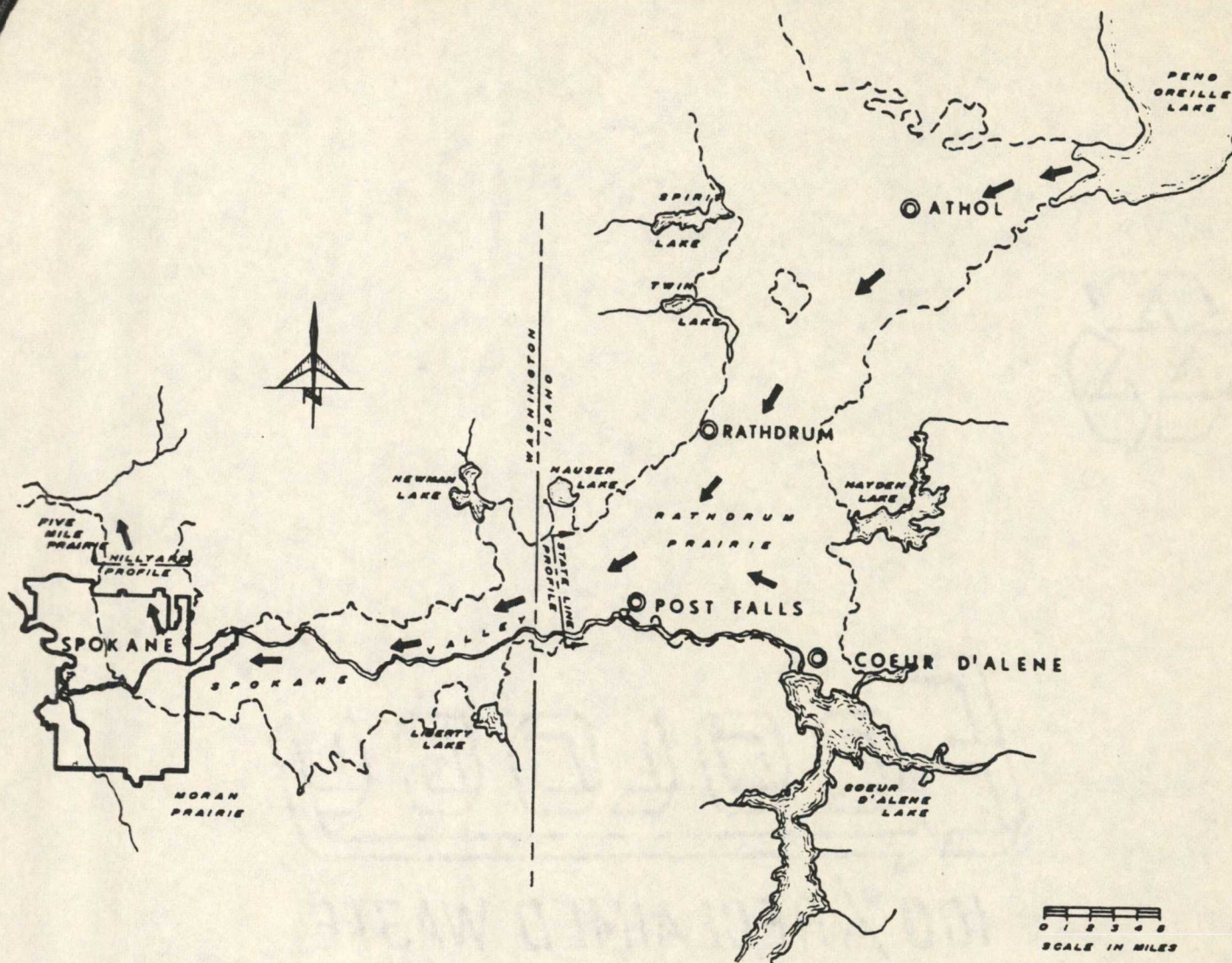


Figure 3:

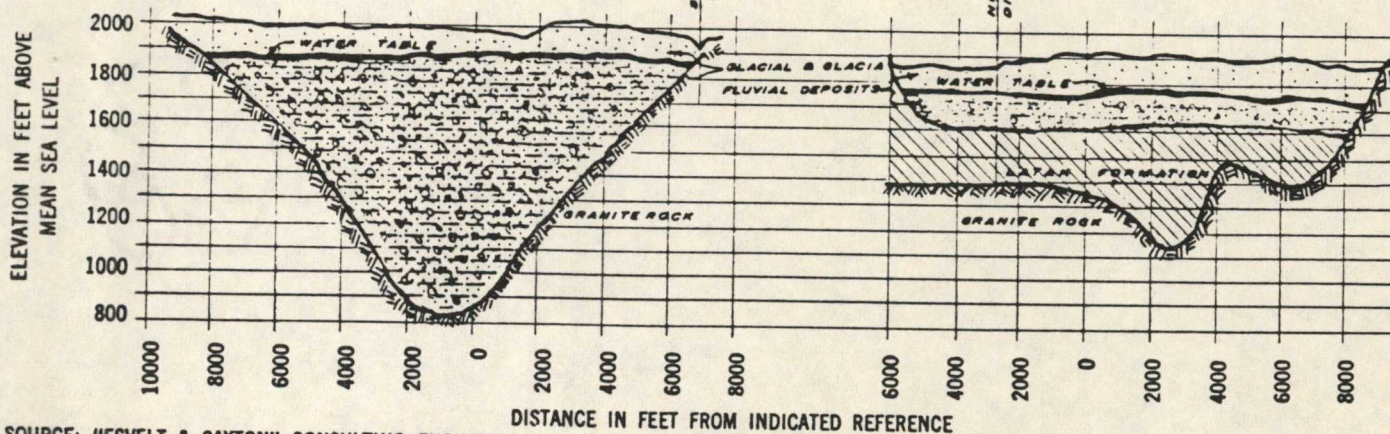
Ground

DIRECTION OF UNDERGROUND WATER FLOW — SPOKANE VALLEY



STATE LINE SEISMIC PROFILE

HILLYARD TROUGH
SEISMIC PROFILE



SOURCE: "ESVELT & SAXTON" CONSULTING ENGINEERS

SEISMIC PROFILE DATA IS FROM "SEISMIC CROSS SECTIONS ACROSS THE SPOKANE RIVER VALLEY AND THE HILLYARD TROUGH, IDAHO AND WASHINGTON" BY R. C. NEWCOMB AND OTHERS. (U.S.G.S.)

CITY PLAN COMMISSION

SPOKANE, WASHINGTON

MAY, 1963

of Spokane Valley (4). Most of the ground water in the Spokane Valley enters the aquifer from the east, flows quickly along the axis of the valley, and leaves the aquifer many miles to the west, largely as flow into Spokane and Little Spokane Rivers (4). From the south end of Lake Pend Orielle (located northeast of Spokane), ~~the~~ ⁶ great stream of ground water flows through the porous formation of the Spokane Aquifer for 50 miles to Spokane, its water course dropping 160 feet over this course (5) (Figure 3). Data obtained during the past 30 years indicate the major source of this flow is seepage from Pend Oreille Lake. Precipitation on the lowland plains above the flow and seepage from Coeur d'Alene Lake add considerably to the flow. Leakage from the smaller lakes is negligible in quantity (5).

Ground water flow beneath the site is likely to be to the northwest (Figure 3). The quantity of water flowing through the Spokane aquifer has been estimated to be in excess of 350 million gallons per day or about 243,000 gallons per minute (Ref. 1). The Spokane aquifer has been accorded sole source status in the Spokane Valley under § 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93-523). According to well logs ~~that~~ ^{the} water level is found at 25 feet below ground level (BGL) in gravel approximately 1/2 mile south of the site.

1.2.3 Climate

The Spokane area has the characteristics of both marine and continental climates. Summers are typically warm and dry, winters are cold and damp. The mean annual air temperature at the Spokane airport is 47.1°F ^(3,4,6). ~~As shown in Figure 3,~~ July is the warmest month (69.7°F) and January the coldest (25.1°F). Afternoon temperatures in summer generally range from 80° to 90°, but occasionally reach 100°F; however, temperatures drop rapidly after sunset. Afternoon temperatures in winter range from the upper 20's to the upper 30's with nighttime readings of 15° to 25°F.

The mean annual precipitation at Spokane is 16.7 inches. July has the smallest mean monthly precipitation (0.50 inch) and December the largest (2.49 inches). Most of the precipitation between early December and late February falls as snow and remains on the ground. In an average year, 10 to 20 thunderstorms occur between March and October ^(3,4,6).

Winters are characterized by considerable cloudiness and occasional dense fogs. The percentage of possible sunshine received each month ranges from about 20 percent in December to about 85 percent in July and August. Prevailing winds are from the southwest in summer and northeast in winter. A few warm "chinook" winds are common each winter ^(3,4,6).

1.3 Process Description

The SJA site began operations in the 1940's and was used as a repository for military surplus and scrap. Other material believed to have been stored on site during active years are asbestos, munitions, surplus chemicals (hypochlorites, solvents), and general refuse. The metal scrapping facility, which has been inoperative for many years, ~~was involved in transformer and battery salvage.~~

delete
(for
SJA)

2.0 BACKGROUND DATA COLLECTION ACTIVITIES

2.1 Previous Investigative Activity

The Spokane Junkyard site was brought to the attention of the EPA as a result of a fire and explosion that occurred on July 15, 1987. Due to the involvement of chemicals and the location of the facility, the EPA responded to the fire and began a removal action. The EPA initially attempted to characterize the extent of PCB contamination with extensive surface and subsurface soil sampling and ^{with} a geophysical survey to attempt to locate buried transformers and drums.

2.1.1 Geophysical Survey

From August 18 through August 20, 1987 the Dunn Geoscience Corporation performed surveys of the site using the proton magnetometer and an Electromagnetic (EM) Conductivity Meter (Geonics EM-31). The survey grid lines were spaced 50 feet apart and readings were recorded every 50 feet along the lines. The purpose of the geophysical investigation was to locate areas containing large concentrations of buried metallic objects, possibly including transformers, tanks, or clusters of drums. According to the geophysical data approximately 47% of the values were the results of cultural interferences (e.g., metal fences, railroad spurs, underground pipes, power lines, buildings and surface metals) (X). was it
25' it
(J or 30)

The results of the geophysical data indicate that there are no concentrations of buried drums, tanks, or transformers within the study area (X). However, it is possible that individual drums, tanks, or transformers may have isolated occurrences within the major anomaly areas (X). The size, shape, pattern and distribution of magnetic data show discrete, variably spaced anomalies which are indicative of an area containing numerous, very shallow sources (X). 2

Dunn Geoscience Corporation dug three test pits at various geophysical anomaly locations to attempt to identify the subsurface source of these anomalies. The first test pit was located in an area having total magnetic intensity values slightly elevated above background. The test pit encountered only a very small mass of ferrous metal consisting of occasional small pieces of near-surface scrap (X). The second test pit was located in an anomalous area having the broadest and highest total magnetic intensity values. A large concentration of ferrous metal with a cumulative mass of approximately 100 pounds was excavated (X). The third test pit was located in a narrow anomaly area having high total magnetic intensity values. A moderate amount of ferrous metal scrap with a cumulative mass less than 20 pounds was excavated (X). 2

2.1.2 Technical Assistance Team (TAT) Sampling Effort

To access the extent of soil contamination at the site the TAT set-up a 50' x 50' grid pattern over the entire site and collected composite soil samples in each grid location (Figures 4 and 5). The soil samples were collected in three phases in an attempt to define the lateral and vertical extent of PCB contamination.

Phase II not BACKGROUND performed on SAMPLES X backgrounds.

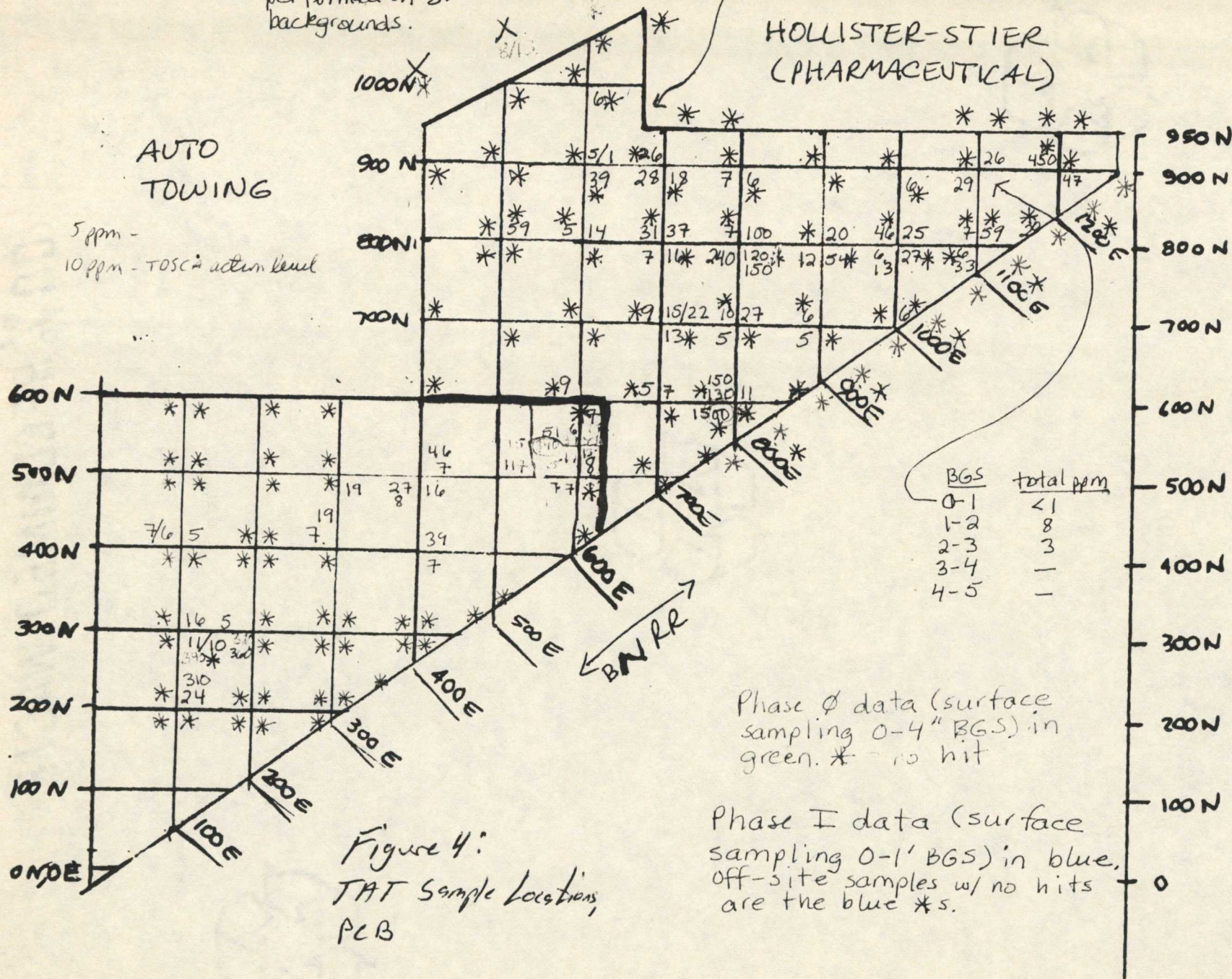
BGS total ppm
3 1/2 5
4 1/2 -

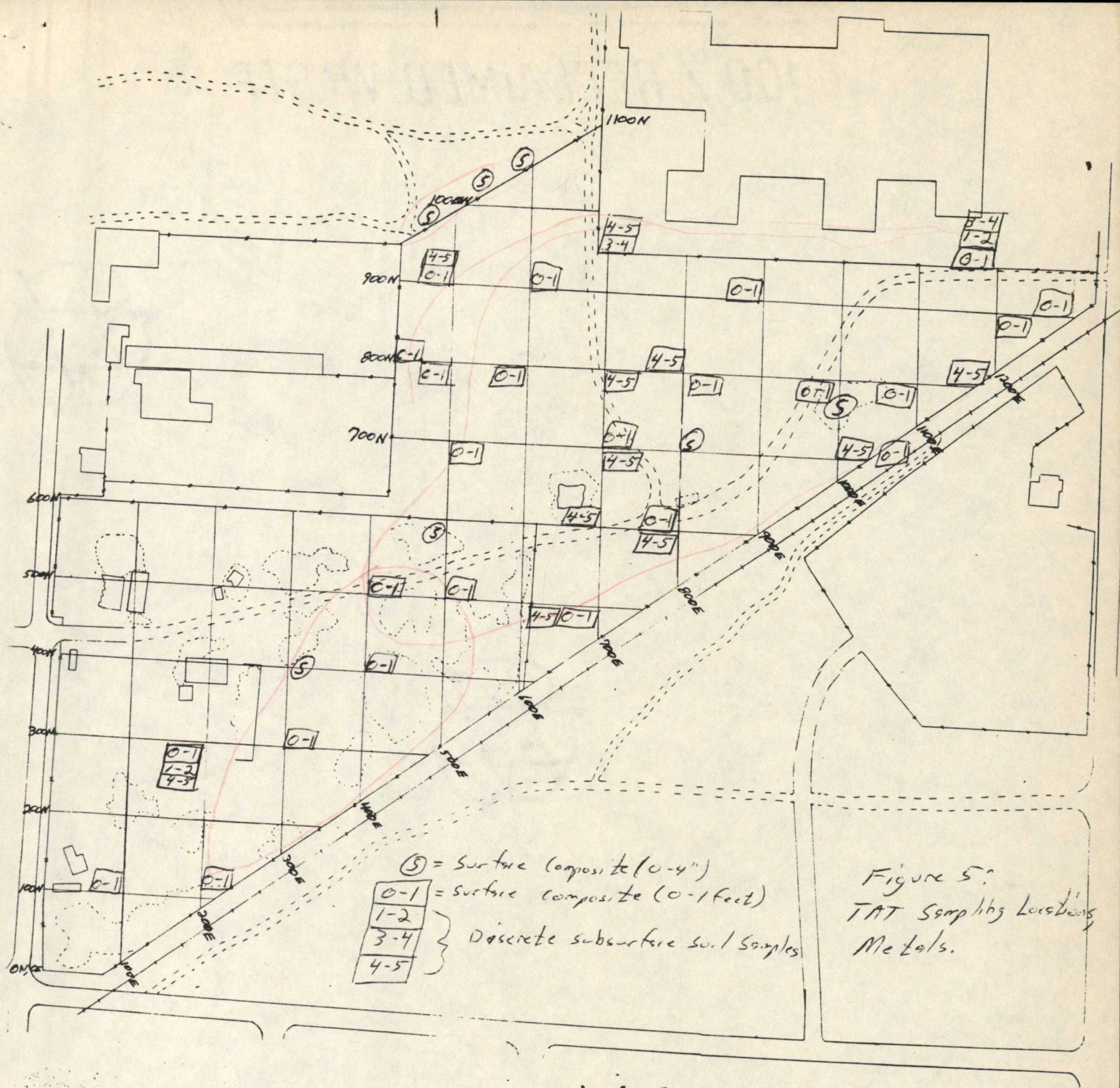
PCB DATA 12/9/87

HOLLISTER-STIER
(PHARMACEUTICAL)

AUTO
TOWING

5 ppm -
10 ppm - TOSCA action level





Phase 0 work consisted of surface soil composite samples at 0-4" below ground surface (BGL). Each composite soil sample consisted of six aliquots collected within the 50' x 50' grid. The Phase 0 sampling was confined to the Spokane Junkyard area and background samples for PCB contamination (Figure 4). Seven 0-4" composite soil samples were collected for metals analysis; of which three were background samples, two samples were collected within the Spokane Junkyard, and two samples were located in the Spokane Metals area (Figure 5). In the northeast corner of the Junkyard the surface soil samples were concentrated in a 30' x 30' grid pattern due to high PCB concentrations of up to 840 ppm.

Phase I work consisted of six 0-1' interval aliquots collected within each 50' x 50' grid using a backhoe. The aliquots were composited and homogenized to make one sample. For PCB contamination the Phase I work was concentrated in the Spokane Metals area with the exception of a few samples in the Spokane Junkyard where "hot spots" were identified during the Phase 0 work (Figure 4). Phase I work for metals contamination was spread fairly evenly over the entire site, encompassing both the Spokane Junkyard and Metals facilities (Figure 5).

Phase II work consisted of excavating a trench to a five foot depth with a backhoe and collecting scrap samples from the sides of the trench in one foot intervals starting at one foot BGL (e.g., 1-2', 2-3', 3-4' and 4-5' intervals). These samples were discrete in that the various interval samples were collected from one trench location within the 50' x 50' grid. The locations of these deep trenches were concentrated in the Spokane Metals area for both PCB and Metals' samples (Figure 4 and 5). It should be noted that the Metals' samples were not collected at every one foot interval with depth, but were mostly collected at the 4-5' BGL interval. ~~(with a few exceptions).~~

2.1.2.1 Data Interpretation

The soil samples data results from the TAT sampling effort indicates large areas of PCB and metals contamination on and off the site (see Appendix A). For PCB contamination the Phase 0 sample results (0-4" surface composite) delineates two areas with high concentrations of PCB contaminated soils in the Spokane Junkyard facility. One area is in the northeast corner of the Junkyard and covers an area of approximately 250' x 250'. The levels of PCBs in the top four inches of soil range from 7 ppm to 840 ppm. The second area within the junkyard is approximately 50' x 75' and is located in the southwest portion, ~~about 100 feet east of the W.S. property fence along Cook Street and approximately 150 feet north of the railroad tracks.~~ The levels of PCBs detected in the soil ^{from this area} ranged from 5 ppm to 340 ppm. PCBs were detected in one of the three "background" samples, collected north of the site, at 13 ppm.

Phase 0 metals data results from seven surface soil composite samples (0-4" depth) indicates high concentrations of lead, copper, chromium, barium and zinc (Appendix A). The three "background" samples, collected north of the site, had levels of lead as high as 1,330 ppm,

copper at 813 ppm, chromium at 385 ppm, barium at 2,460 ppm and zinc at 1,440 ppm. The highest levels of the various metals found on site in the surface soil are as follows:

Arsenic	114 ppm
Barium	2,600 ppm
Chromium	40,600 ppm
Copper	540 ppm
Cyanide	181 ppm
Lead	6,090 ppm
Zinc	35,900 ppm

The Phase I sample data results for PCB contamination indicate that most of the Spokane Metals facility is contaminated with PCBs. High levels of PCBs were detected in the soils even though the sampling method used by the TAT (i.e., compositing six 0-1' interval aliquots) promotes obvious dilution of surficial PCB contaminated soils. The concentrations of PCBs from the Phase I sampling range from 59 ppm in the northwest portion of Spokane Metals to 1,500 ppm in the south-central area to 450 ppm in the northeast corner of the Spokane Metals facility.

The Phase I Metals data results indicate high levels of various metals including barium, arsenic, cadmium, chromium and lead throughout the south-central, northeast and extreme northwest areas of the Spokane Metals facility. The highest concentrations of various metals in the on-site soils are as follows:

Arsenic	187 ppm
Barium	748 ppm
Cadmium	126 ppm
Chromium	347 ppm
Copper	26,600 ppm
Lead	3,840 ppm
Nickel	215 ppm
Selenium	391 ppm
Zinc	9,990 ppm

Phase II sample data results for PCB contamination had only two locations where PCBs were detected below one foot depth. One location was off site in the southwest corner of Hollister-Stier Pharmaceutical property where PCBs were detected at 3-1/2 feet BGL at 5 ppm. The second location was in the northeast corner of Spokane Metals where 3 ppm PCBs were detected at two to three feet. No significantly high levels of metals were found at the four to five foot interval.

During the removal actions approximately 150 drums of materials were composited and repackaged, and 140 cubic yards of asbestos were disposed of. The drummed waste streams included PCB oils, flammable liquids and solids, halogenated solids and liquids, and corrosives.

2.2 HRS II Site Inspection Activities

In order to satisfy the HRS II model specific information pertaining to the various pathways was obtained by the E&E/FIT during their initial site visit on December 10, 1987.

The E&E/FIT contacted the National Weather Service at the Spokane Airport to obtain data on local meteorological conditions. Precipitation, temperature, evapotranspiration and wind spread and direction data was gathered from 1957 to 1986.

The Soil Conservation Service was visited to obtain current information on the soils underlying the Spokane Junkyard site. Data on percent clay content, percent organic matter and soil type was collected by the E&E/FIT. The Spokane County soil survey also supplies information on soil permeability, pH, soil depth and underlying materials from which the soils are derived.

Information on the Spokane Aquifer was collected by visiting the U.S.G.S. office, the Spokane Water Department and the Washington Department of Ecology (WDOE). A Ground water investigation report, geologic maps, aquifer maps, well logs and general hydrologic information was gathered by the E&E/FIT. The information collected defines the aquifer boundaries within four-mile radius of the site, gives depth to water data, stratigraphic logs, ground water flow directions, drinking water well locations and depths within four miles of the site, public water supply well locations, and aquifer thickness and material. Further information on the hydraulic conductivity ^{in the Spokane Valley} and on the Spokane Aquifer in general will be obtained from Professor John Buchanan at Eastern Washington University. Professor Buchanan is a sedimentologist/hydrologist and has done extensive research on the Spokane Aquifer.

Two schools lie within one mile of the site and the E&E/FIT visited these schools to obtain the number of students and staff associated with the schools. For the elementary school across the street from the site the number of students below the age of seven was obtained.

The site does not contain any surficial runoff routes and no nearby streams or runoff routes exist to raise concerns about the overland migration of contaminants from the site.

U.S. Census data on Spokane, Washington was obtained to assist in determining the number of people residing within the various population circle distances from the site as outlined in the HRS II model.

3.0 ON-SITE ACTIVITIES

The E&E/FIT visited the Spokane Junkyard site on December 10, 1987 between 0900-1300 hours. The site has very little relief with no visual runoff routes or erosion of surface materials. Sparse vegetation of shrubs and grass cover parts of the site, but the majority of the surface is bare soil or debris and scrap metal. Evidence of the July 15, 1987 fire was noted ~~with~~ charred areas on site.

we may need to get addresses of under 7 to determine location from site

The site is covered with open trenches from the TAT sampling effort in August and September. Through sumpage and runoff into the trenches, oil sheens and dark stained soil was observed at the bottom of the open trenches.

The E&E/FIT measured a sampling grid north of the Auto Towing outfit and Spokane Metals site and located potential sample points for surface composite samples. In the field north of the site ~~and towing facility~~ piles of charred battery cases with stained soil were observed in a number of locations. Oil stained soil was also observed along the north side of the Auto Towing property fence.

The E&E/FIT drove around the surrounding neighborhood and identified residencies from which soil samples will be collected to access potential wind transport of contaminants from the site.

4.0 SAMPLING PROGRAM

4.1 Sampling Rational

The sample data results from the previous TAT sampling effort will be used to assist in identifying source areas on site and for determining the areal extent of contamination.

4.1.1 Ground Water Migration Pathway

The E&E/FIT will sample downgradient domestic wells within one mile of the site (including one downgradient well approximately 1,000 feet from the site) and one upgradient well in an attempt to establish an observed release. Spokane Public water wells (supplying about 187,000 people) will also be sampled and these wells are located two to three miles downgradient and side gradient of the site. All the wells are screened in the Spokane Aquifer, which is designated as a sole source aquifer by the EPA. Deep 10 foot soil borings will be drilled in the "hot spots" on site and samples collected at one foot intervals to determine the vertical extent of contamination from which to measure depth to the aquifer. The borings will also determine if an alledged landfilling of PCB wastes at 6-12' BGL actually took place at the Spokane Metals site (_).

4.1.2 Surface Water Migration Pathway

This pathway is not being considered as a potential migration route for contaminants to leave the site. The site is flat and has no evidence of surface runoff or erosion. There are no nearby streams, roadside ditches, sewers or other runoff pathways. The soils underlying the site are gravelly loams with high permeability, so that precipitation is more likely to soak into the ground than move laterally as runoff.

4.1.3 Air Migration Pathway

In addition to the contaminant areas established by previous sampling, the E&E/FIT will collect surface soil samples along the perimeter of the site (both on and off site) to determine the areal extent of the PCB and metals contamination. Three background soil samples will be collected upwind and away from the site to establish natural concentrations of metals in the soil. Additional surface soil samples will be collected from a nearby elementary school property and a number of residences surrounding the site to determine if contaminated particulates are migrating into the adjoining neighborhood. The summer months in Spokane are hot and dry and the soils underlying the site are considered to be dusty during dry periods (3). In order to establish an observed release for airborne particulate migration from the site, additional air sampling is recommended during the dry months.

4.1.4 On-Site Exposure Pathway

The surface soil sampling described in the Air Migration Pathway section will be used to determine "site" boundaries (defined by extent of attributable soil contamination) and direct exposure at the elementary school and residential properties surrounding the site.

4.2 Sample Types, Numbers, and Analytical Requirements

A total of 87 surface soil composite samples will be collected at on-site and off-site locations (Figure , Table 4-1). In addition, approximately eight ground water samples will be collected from various domestic and public water supply wells surrounding the site. Sampling of these wells is contingent upon owners permission. The surface soil samples will be analyzed for polychlorinated biphenyls (PCBs) and heavy metals. Surface soil samples collected from ~~residential~~ ^{off-site} properties will undergo an additional analyses for asbestos. Ground water samples will be analyzed for PCB, heavy metal, volatile organic and pesticide fractions. Both soil and ground water samples will be analyzed through the USEPA Contract Laboratory Program (CLP).

Field quality assurance samples will include sample duplicate (soil and ground water), rinsate samples (soil), a transfer blank (ground water), and a transport blank (ground water). Approximately 10% of the samples will be flagged for duplicate ^{analysis} ~~analyzer~~ to evaluate consistency of the sampling techniques and assess laboratory performance. Rinsate samples will be collected from decontaminated collecting trowels and stainless steel bowls. The transport blank will be prepared in laboratory ^{?conditions} prior to the sampling visit. Table 4-2 summarizes the anticipated sampling program.

are they
enough already
to allow 8 g/w
samples
most be
1 d/w analysis

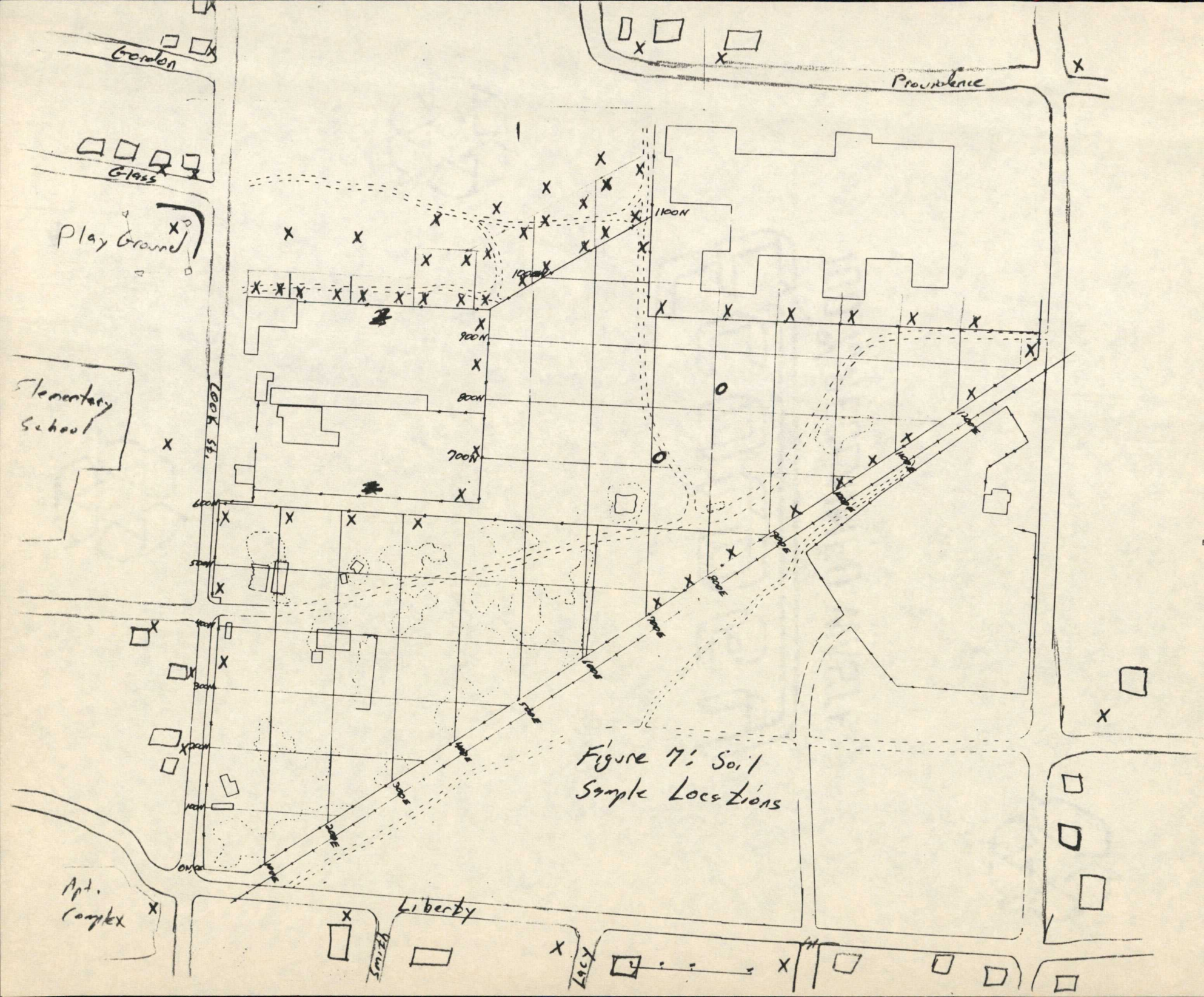


TABLE 4-2
SAMPLE SUMMARY

Anticipated Number of

Samples	Transport Transfer Blanks	Sample Duplicate	Rinsate Samples	Sample Matrix	Sample Types	Required Analyzer
16 52	0	2 X	1 X	on-site Surface	Composite	PCB, Metals
37	0	4	3	Soil off-site surface soil	(composite)	PCB, Metals and Asbestos
14	0	2	1	Domestic Surface Soil	Composite	PCB, Metals and Asbestos
20	0	2	1	Soil Boring	Composite	PCB, Metals
8	1	1	0	Ground Water	Grab (un- filtered)	PCB, Metals VOA, Pesti- cide

D/W
analysis

4.3 Sampling Methodologies

4.3.1 Soil Composite Sampling

4.3.1.1 Grid Sampling

To assess the off-site aerial extent of PCB and metals contamination, a soil sampling grid (W grid) system (~~see Figure~~) has been developed beyond the fence line, adjacent to the northern site boundary. The grid ~~network~~ of 22 sampling locations is based on 50-foot centers. An ~~accessory~~ sampling grid (HS grid) was positioned along the Hollister-Stier property just north of the ~~terminal~~ ~~site~~ boundary. These grid locations were selected based on previous analytical data resulting from the E&E Technical Assistance Team (TAT) ~~investigation~~ conducted during the summer of 1987. They were designed to determine the extent of surface contaminants in those areas and obtain information pertinent to the HRS II on-site exposure ~~pathways~~ ^{and air migration}.

At each of the grid locations, a surface soil sample will be collected as a homogenized composite of five aliquots from a 15-foot diameter area. Each aliquot will be collected as a composite of the surface six-inch depth interval. Each aliquot will be collected with a stainless steel trowel and homogenized in a stainless steel mixing bowl.

In addition to the formal sampling grid locations, approximately six surface composite samples will be collected in the field north of the W grid. These locations will be based on visual observations of probable contaminant point source areas (e.g., asphalt piles, junk, spent battery casings). Six composite samples will also be collected from a previously unsampled on-site area situated south of the towing grid to augment previous data from that area.

The on-site grid samples will be analyzed for PCB and heavy metal fractions.
All ^{off-site} grid samples will be analyzed for ^{asbestos,} PCB and heavy metal fractions. * Analytical requirement for the grid area sampling are summarized in Table 4-1.

4.3.2 Residential Soil Sampling

Surface soil composite samples will be collected from approximately 15 residences surrounding the site ^{and an elementary school located west of the site.} These locations were selected based on proximity to the site and the prevailing wind direction as indicated from National Weather Service (NWS) ^{Wind rose} data ⁽⁶⁾. ^{Three} Through background soil samples will also be collected from locations off site. These locations will be arranged in a ^{triangular} pattern and will be situated at a one-mile radius from the site. In addition, four soil composite samples will be gathered from the towing yard situated adjacent to the site. Sampling methodology will be ^{analogous} to that observed for grid sampling (Section 4.3.1.1).

Data obtained from these composite samples will be evaluated with regard to areal distribution of surface soil contamination, and applied to HRS II model scoring for the on-site/direct exposure pathway ^{and the air migration pathway.}

Each off-site soil sample will be analyzed for PCB, heavy metals, and asbestos. Analytical requirement for the sampling event are summarized in Table 4-1.

4.3.2 Soil Borehole Sampling

4.3.2.1 Soil Profiling

To further assess on- ~~and off~~ site vertical ~~and horizontal~~ soil contamination, ~~two~~ 10-foot soil borings will be ^{conducted} for internal sampling and analyses (see Figure 4-). The borings will be conducted in areas that are known or suspected to be contaminated as a result of previous investigative activity. These borings will provide more complete information on the vertical distribution of contaminants potentially migrating from the shallow zone into deeper soils and possibly to ground water. In addition, they are located in areas where alleged landfilling of PCB and heavy metal waste may have occurred (). A portable Minuteman solid stem auger soil sampling rig will be used to negotiate each boring.

Each boring will involve the collection of samples from one-foot intervals beginning at surface levels and extending to the respective depth. Subsequent to the removal of the first six inches of soil per each one-foot interval by the Minuteman, discrete sample will be collected from the last six inches of the respective intervals via a bucket

auger. Soils from each depth will be homogenized in a stainless steel bowl with chrome-plated trowels or stainless steel spoons and placed in labelled eight-ounce jars with Teflon-lined lids. Each sample will be screened using an HNU Systems (HNU) non-specific photoionization detector, and recorded in the appropriate field log by an on-site geologist.

Decontamination of augers and sampling implements will occur between each boring. Equipment decontamination procedures are outlined in Section 4.4.

The borings will ²⁰ ~~contain~~ the collection of 16 samples, each of which will be analyzed through the CLP for PCB and heavy metal fractions. In addition, samples from one shallow and one deep boring will be analyzed for grain size and organic matter content as indicated by total organic carbon (TOC) analyses. These analyses will provide information on the ~~ease~~ ^{of} downward contaminant migration ^{on-site soils}, as ~~mobility~~ ^{of} metals and organic compounds in soil greatly depends on soil texture and organic matter content. Analytical requirements are summarized in Table 4-1.

4.3.3 Domestic and Public Well Sampling

Ground water samples will be collected from eight residential and municipal wells at varying locations and distances (up to four miles) from the site.

Each of the ground water samples will be analyzed through the CLP for PCB, heavy metal, VOA, and pesticide fractions. *DAU analysis*

The method used for collecting water samples from the domestic and municipal wells will be determined by the type of pump installed at the well. Those wells equipped with either a submersible or centrifugal pump will be sampled from a downstream source (faucet) subsequent to a 10-minute purge. Prior to sampling from an above-ground casing, three well volumes will be purged using a Johnson-Keck, two-inch submersible pump. ~~Immediately following purging of the respective system, sample container will be triple rinsed with the medium being sampled before accepting the sample volume.~~ A dedicated Teflon bailer will be used during sample collection from an above-ground casing. At the time of sample collection, field parameters (pH, conductivity, temperature) will be recorded.

4.3.4 Personnel Safety and Equipment Decontamination

Personnel safety and equipment decontamination procedures will be addressed in the Site Investigation Health and Safety Plan.

Where possible, disposable sampling and personnel safety equipment will be used. Prior to on-site entry, all associated tools and sampling implements will be decontaminated with analconox solution and a high pressure steam wash. During actual field work and prior to site exit, all sampling equipment (auger sections, bits, spoons, trowels, bowls,

etc.) will be decontaminated between successive borings with an alconox and water scrub wash, a tap water rinse, an isopropyl alcohol/acetone rinse, a high-pressure steam wash, and a distilled water rinse.

4.4 Data Use

Quality assured data will be used to confirm previous SJA data, assess the impact of the facility on the local environment, and support conclusions regarding the revised draft HRS II scoring techniques.

4.5 Laboratory Notification

Prior to commencing sampling activities at the site, the Sample Control Center Coordinator of the Environmental Services Division (ESD) will designate the laboratory(s) where collected samples are to be sent. E&E will notify either the USEPA Region X laboratory or the designated contract laboratory through the Sample Control Center Coordinator of ESD on the day(s) on which sampling is to occur. The team will confirm the sample documentation numbers, the number of samples to be shipped and the type of analysis to be required, and will verify their arrival at the designated laboratory.

4.6 Sample Documentation and Handling

The potential evidentiary nature of the data collected during this site investigation requires that the possession of samples be traceable from the time they are collected until they are introduced as evidence in enforcement proceedings.

All sample data (date and time of collection, sample station, field measurements, etc.) will be recorded in a field notebook and a field documentation form. Sample custody seals will be placed on the front and back of all sample shipping containers (i.e., steel coolers) after the sample containers have been filled. Samples will be accompanied by Region X Field Sample Data Sheets and Chain-of-Custody Sheets, CLP Traffic Report Forms, and any other pertinent shipping/sample documentation information. These forms will be placed in a ziplock bag and taped to the inside of the ice chest. All sample documentation and Chain-of-Custody procedures will be followed as specified in the National Enforcement Investigations Center policy and procedures guidelines (May 1978, Revised June 1985).

All samples will be packed in accordance with National Enforcement Investigations Center guidelines (April 1980).

Specific sample handling criteria are summarized in Table _.

TABLE _
SAMPLE HANDLING SUMMARY

Matrix	Parameter	Maximum Holding Time	Preservatives
Soil	PCB		Ice
Soil	Heavy Metals		Ice
Soil	Asbestos		Ice
Water	PCB	7 Days	Ice
Water	Heavy Metals	6 Months	Ice
Water	VOA	7 Days	Ice
Water	Pesticide	7 Days	Ice

* These fractions will be field screened; specific analytes includes pentachlorophenol and creosote.

4.7 Investigation-Derived Wastes

The types of wastes that will be generated during the investigation include decontamination fluids, drill cuttings, purge water, and disposable clothing.

Decontamination fluids, drill cuttings, and purge water will be collected in a catch basin and disposed of according to EPA protocol (drummed). Disposable equipment (protective clothing, miscellaneous refuse, etc.) will be double-bagged for disposal in a local landfill.

leave on site

5.0 SPECIAL FIELD INVESTIGATION PROCEDURES

6.0 QUALITY ASSURANCE PROCEDURES

6.1 Quality Assurance Objectives

The general quality assurance (QA) objectives for this project are to develop and implement procedures for obtaining and evaluating data that can be used to assess site hazards, develop and evaluate alternate remedial actions, and be legally defensible in a court of law. In order to provide legally defensible data, it is necessary that all measurement data have an appropriate degree of accuracy and reproducibility, along with assurance that samples collected are appropriately representative of actual field conditions. All sample data will be used to assess site conditions and determine the potential impact on the public health/environment. If the site is determined to be a public threat, additional work, including more specific quality assurance procedures, may be required.

All collected samples must meet the quality control objectives (i.e., for method, detection limits, precision, accuracy, completeness) for the particular parameter requested (e.g., heavy metals, base/neutral extractables, etc.) as specified by either the Contract Laboratory Program (CLP) or the USEPA Region X laboratory.

Standard Operating Procedures (SOP) have been developed that detail procedures for performing all tests at an acceptable level of quality control. The SOPs also ensure that data is intercomparable, interpretable and defensible.

6.2 Quality Assurance Checks

6.2.1 Calibration Procedures and Frequency

All field equipment used during the site investigation will be operated, calibrated, and maintained according to the manufacturers' guidelines and recommendations. Operation, calibration, and maintenance will be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and measurement will be maintained throughout the duration of the sampling program (Table _).

Preventive maintenance and check procedures for field instrumentation likely to be used during a site investigation sampling are described in Table _ . [List only the equipment you expect to use.]

TABLE _
CALIBRATION AND FIELD CHECK FREQUENCY SCHEDULES

Equipment *	Regular Calibration and Maintenance Required (NOTE A)	Field Check Prior to Shipment (NOTE B)	Field Calibration Required Be- fore Each Use (NOTE B)
HNU/OVA	Monthly	X	X
Conductivity Meter		X	X
pH Meter		X	X
MiniRam		X	X

* = Equipment routinely used during a site inspection/sampling
 Note A = To be performed by designated regional instrument repairman
 Note B = With the exception of the OVA these calibrations and checks
 are to be performed by the site field team

6.2.2 Internal Quality Control Checks and Frequency

Quality control checks for sample collection will be accomplished by a combination of the following items:

- Duplicate samples: Duplicates will be submitted in order to evaluate the precision of laboratory results. The numbers of duplicate samples required by the field sampling will be at least 10% of the total of each sample type.
- Background samples: Background water samples (ground water) will be collected to evaluate the site's impact on native water quality. Background soil samples will also be submitted to facilitate evaluation of soil matrix effects on laboratory analyses.
- Blank samples: Sample blanks (transfer/transport) will be included in each set of water samples collected during the sampling program. The blanks will consist of either carbon-free water and/or deionized water depending on the analyses required. (Soil sample blanks are not submitted to the laboratory at this time per instructions CLP).
- Chain-of-Custody: Standard EPA protocols will be followed in order to preserve the integrity of the samples between collection and analysis (NEIC, 1985).

- Laboratory QA: Analytical procedures will be evaluated by using items such as surrogate spikes, matrix spikes, duplicates, reagent blanks, and inter-element correction checks.
- Rinsate Samples: Aqueous rinsate samples will be collected from non-dedicated sampling equipment to evaluate sampling decontamination procedures and the potential for cross-contamination of samples. Rinsates will be made from either carbon-free water and/or deionized water, depending upon the required analyses.

6.3 Data Reduction, Validation, and Reporting

When analytical data/test data has been reduced, the method of reduction will be described in the final report.

Validation of all analytical data will be performed by senior chemists at Ecology and Environment, Inc., or at the Region X USEPA laboratory. Laboratories participating in the CLP program will be required to submit results that are supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of the data. Validity of all data will be determined based on the precision and accuracy assessments required by the USEPA. Upon completion of the review, the senior chemist will be responsible for developing a QA/QC report for each analytical package. All data will be stored and maintained according to standard document control procedures.

All field measurements will be verified by the field team leader and will be recorded in a field note book for future reference.

All raw data generated for project sampling tasks and used in the final site inspection report will be appropriately identified and collected in a separate appendix within the final report.

6.4 Performance and System Audits

The Regional EPA laboratory or contract laboratory facilities used by Ecology and Environment, Inc. personnel will be required to take part in a series of performance and systems audits conducted by the National Enforcement Investigations Center (NEIC). Laboratory Quality Control data and performance evaluations will be submitted along with analytical results for assessment by program reviewers.

Performance and system audits for E&E sampling operations will consist of on-site reviews of field Quality Assurance systems and equipment for sampling, calibration, and measurement consistent with the Zone II FIT Quality Assurance Manual (Contract No. 68-01-7347). The program Quality Assurance Coordinator will develop and conduct systems audits based on the approved project Field Operations Work Plan. Guidelines provided by the NEIC for performing audits of field activities will be followed.

If for any reason the schedules or procedures cannot be followed, a "Sample Alteration Checklist" form (Appendix B) for each element changed will be completed and this will be reviewed by the Project Manager and the QA Officer/Peer Reviewer.

7.0 PROJECT MANAGEMENT

Project management will be an ongoing process throughout the investigation, and will involve bi-weekly progress reports via conference calls between EPA and E&E personnel; coordination of schedules and other project ? with USEPA and within E&E; managing of the project staff and any subcontractors; coordination with the CLP Laboratory Program; and QA/QC review by E&E chemists.

7.1 Schedule of Tasks and Milestones

The proposed work schedule for the completion of this site inspection is summarized in the milestone chart presented in Table 7-1.

TABLE 7-1

MILESTONE CHART

ACTIVITY	Dec 87	Jan 88	Feb 88	Mar 88	Apr 88	May 88
Work Plan/QA Preparation and Review	- - - -					
Field Work Preparation		-				
Sample Collection		- -				
Analysis of Samples		- - - -				
QA Data			-			
Final Report*				- -		

* Dependent upon receipt and QA of analytical data

7.2 Budget and Costs

The Phase I HRS II Field Test for the Spokane Junkyard site in Spokane, Washington will be completed in 1300 hours. Table 7-2 details the level of effort by task for the entire project.

E&E will perform the proposed work under Contract _____.

TABLE 7-1

ESTIMATED DIRECT HOURS
HRS II FIELD TEST: SPOKANE JUNKYARD

Task Description	Projected Hours	Comments
Project Management	130	Based on 10% of total LOE
Background Data Collection	12	
Site Visit	20	
Work Plan Text	90	
Work Plan Graphics	30	
Safety Plan Development	6	
Equipment List Preparation	1	
Mobilization	9	
Demobilization	9	
Travel	24	
HRS II Model Specific Data Collection	16	
Domestic Well Sampling	20	
Domestic Soil Sampling	24	
On-Site Surface Soil Sampling	136	
On-Site Subsurface Soil Sampling	200	
Decontamination/Waste Disposal	40	
Sample Documentation	24	
Sample Packaging/Shipping	10	
Site Safety	21	
Data QA	244	
Draft Report - Text	80	
Draft Report - Graphics	20	
Draft Report - Data Interpretation	20	
HRS II Scoring/Documentation	4	
EPA 2070-13 Completion	20	
Peer Review	40	
Publication	30	
Final Report	20	

7.3 Project Organization and Responsibility

The following is a list of the key personnel and their responsibilities:

FIT Office Manager	: David Buecker, E&E, Seattle
E&E Project Manager	: Joseph Hunt, E&E, Seattle
E&E Site Manager	: Karl A. Morgenstern, E&E, Seattle
EPA Project Officer	: Deborah flood, USEPA, Region X
EPA Superfund HRS Manager	: David Bennett, USEPA, Region X
EPA QA Officer	: W. Towns, USEPA, Region X
Data Quality Review (EPA Lab)	: Dr. J. Blazavich, USEPA
Data Quality Review (CLP Lab)	: Andrew Hafferty, E&E, Seattle
System Performance Audit	: per REM/FIT Quality Assurance Manual

7.4 Deliverables

E&E will provide the following deliverables for the Phase I HRS II field Test Project:

- o Draft revised HRS testing package
- o Final revised HRS teesting package
- o EPA Region/FIT summary letter reports which include:
 - Overall cost and unit cost information
 - Abbreviated current HRS package
 - FIT project survey form

REFERENCES

1. U.S.G.S., Spokane Quadrangle, 15 Minute Series Topographic Map, 1950.
2. Dunn Geoscience Corporation, "Geophysical Survey, Spokane Junkyard site, Spokane, Washington", September 4, 1987.
3. U.S.D.A., "Soil Survey of Spokane County, Spokane, Washington", U.S. Soil Conservation Service, 1986.
4. U.S.G.S., "Geohydraulic Reconnaissance of a Ground-Water Contamination Problem in the Argonne Road Area Near Spokane, Washington", Water-Resources Investigation Report 86-4173, 1987.
5. Glen A. Yake, "Spokane Water: The Best in the West", Department of Public Utilities, Water Division, city of Spokane, 1965.
6. ~~Dunn Geoscience Corporation, "Geophysical Survey, Spokane Junkyard Site, Spokane, Washington", September 4, 1987.~~

NOAA

ADDITIONAL REFERENCES

- United States Environmental Protection Agency Region X, 1985, Quality Assurance Manual for Drinking Water Programs Investigations.
- _____, 1982, Technical Additions to Methods for Chemical Analysis of Water and Wastes, EPA 600/4-82-055.
- _____, 1982, Methods for Organic Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057.
- _____, 1980, Enforcement Considerations For Evaluations of Uncontrolled Hazardous Waste Disposal Sites By Contractors, National Enforcement Investigations Center, Denver, Colorado.
- _____, 1985, NEIC Policies and Procedures, National Enforcement Investigations Center, Denver, Colorado.